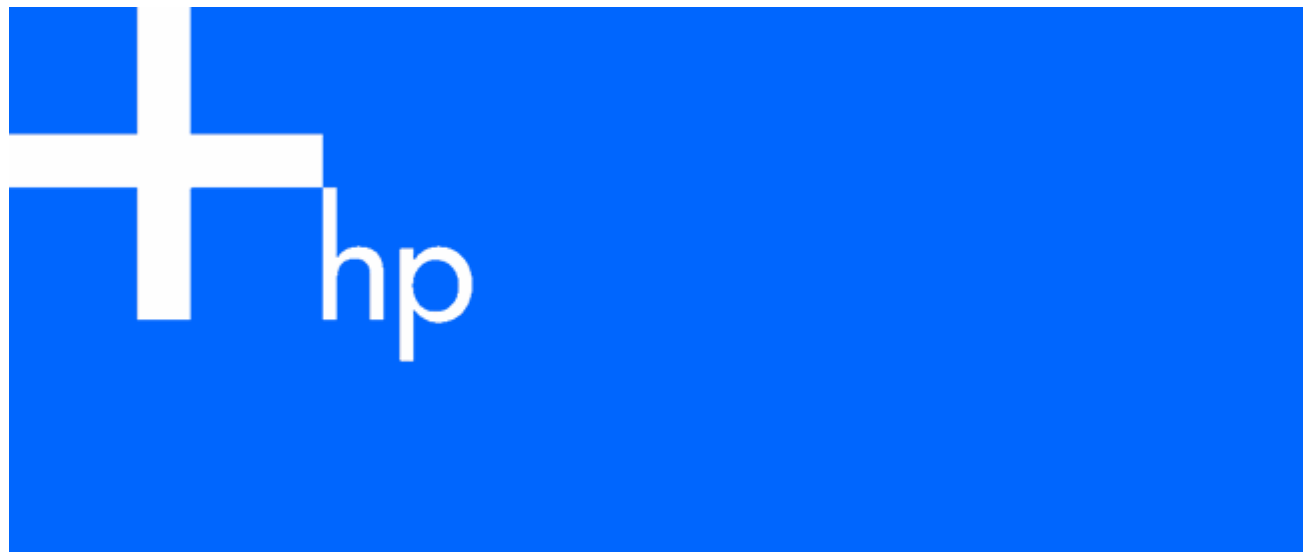


HP ProLiant BL45p Server Blade Maintenance and Service Guide



December 2005 (Third Edition)
Part Number 378423-003



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Audience assumptions

This guide is for an experienced service technician. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

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Illustrated parts catalog

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Customer self repair

What is customer self repair?

HP's customer self-repair program offers you the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you so that you can replace them. Using this program, you can replace parts at your own convenience.

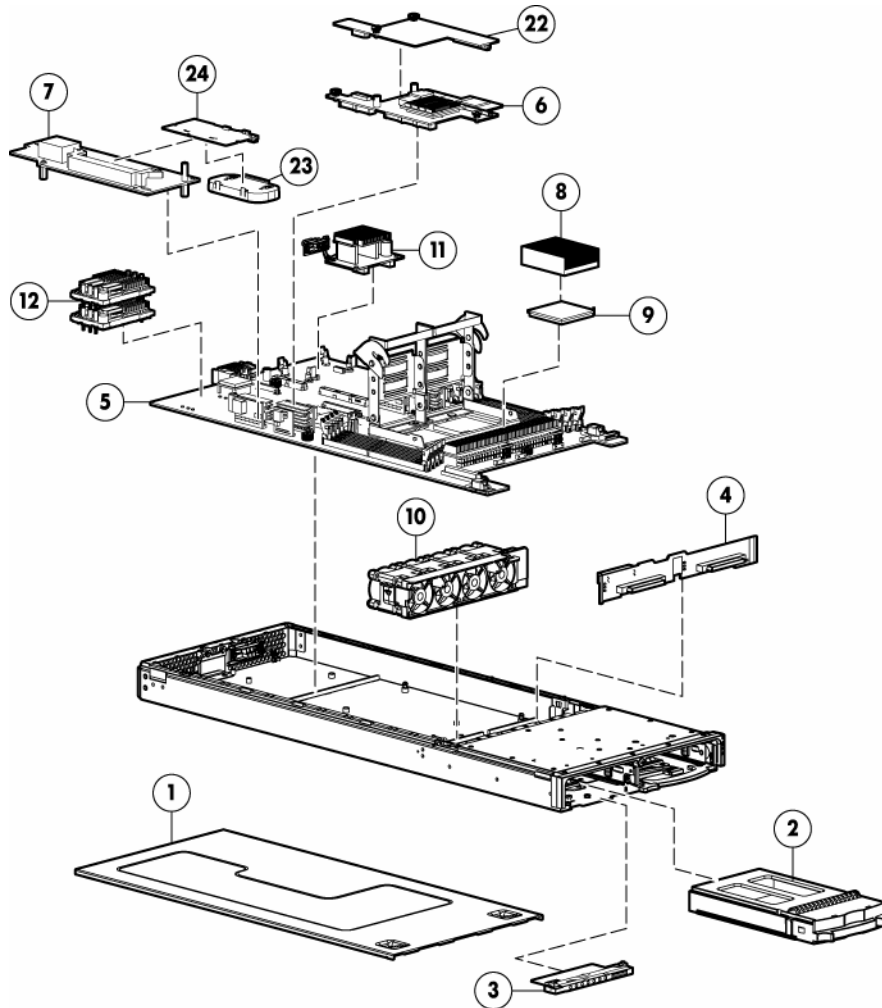
A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.
- Replacement parts are express-shipped. Most in-stock parts are shipped the very same day you contact HP. You may be required to send the defective part back to HP, unless otherwise instructed.
- Available for most HP products currently under warranty or contract. For information on the warranty service, refer to the HP website (<http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>).

For more information about HP's customer self-repair program, contact your local service provider. For the North American program, refer to the HP website (<http://www.hp.com/go/selfrepair>).

Customer replaceable parts are identified in the following tables.

Server blade primary side components



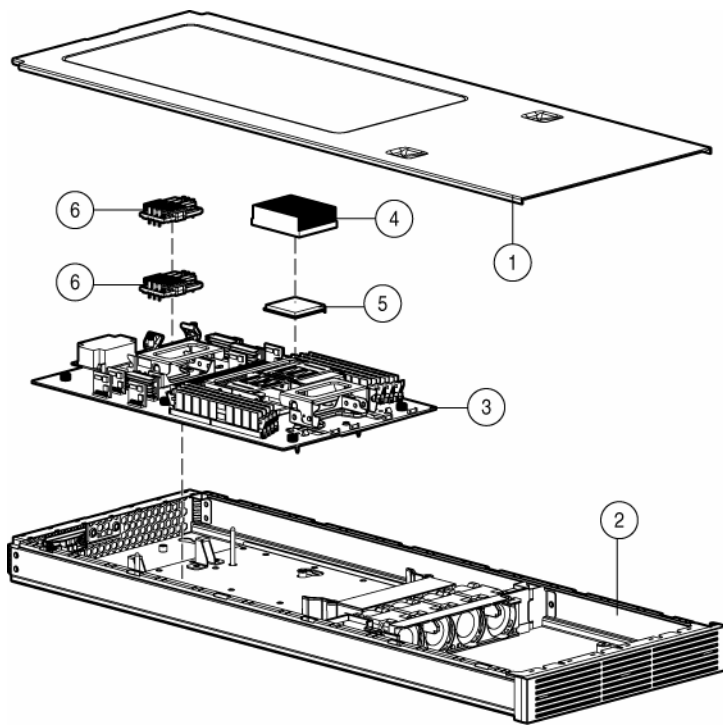
Item	Component	Spare part number	Customer replaceable?
	Mechanical components		
1	Access panel	371709-001	Yes
2	Hard drive blank	122759-001	Yes
	Boards		
3	Power button/LED board kit with LED cable (cable not shown*)	371706-001	Yes
4	SCSI backplane with cables (cables not shown*)	371701-001	Yes
5	System board	385847-001	Yes
6	Standard NIC mezzanine card	381816-001	Yes
7	HP Smart Array 6i Controller	371702-001	Yes
	System Components		
8	Processor heatsink	381812-001	Yes
9	Processor	—	—
	a) 2.6-GHz, single core, AMD Opteron™ Model 852 *	390246-001	Yes

Item	Component	Spare part number	Customer replaceable?
	b) 2.8-GHz, single-core AMD Opteron™ Model 854 *	404043-001	Yes
	c) 1.8-GHz, dual core, AMD Opteron™ Model 865 *	390247-001	Yes
	d) 2.0-GHz, dual core, AMD Opteron™ Model 870 *	390248-001	Yes
	e) 2.2-GHz, dual core, AMD Opteron™ Model 875 *	390249-001	Yes
	f) 2.4-GHz, dual-core AMD Opteron™ Model 880 *	404045-001	Yes
10	Fan assembly	371708-001	Yes
11	DC filter module	371705-001	Yes
12	Power converter modules (2)	371754-001	Yes
13	1p enabler board (processor blank not included) *	403929-001	Yes
	Miscellaneous		
14	Plastics kit *	385848-001	—
	a) Air baffle	—	Yes
	b) Bezel assembly	—	Yes
	c) Ejector latch assembly	—	Yes
	d) Quarter-turn standoffs (2)	—	Yes
	e) Rear power connector thumbscrews (2)	—	Yes
15	Replacement battery, 3.6 V, NiMH *	307132-001	Yes
16	Server blade return kit *	385849-001	Yes
17	Local I/O cable *	355935-001	Yes
	Memory		
18	DIMM, 512 MB, PC3200 DDR SDRAM **	381817-001	Yes
19	DIMM, 1 GB, PC3200 DDR SDRAM **	381818-001	Yes
20	DIMM, 2 GB, PC3200 DDR SDRAM **	381819-001	Yes
21	DIMM, 4 GB, PC2700 DDR SDRAM **	395547-001	Yes
	Options		
22	FC mezzanine	—	—
	a) Emulex-based Fibre Channel Mezzanine for HP p-Class BladeSystem	399852-001	Yes
	b) QLogic-based Fibre Channel Mezzanine for HP p-Class BladeSystem	381813-001	Yes
23	Smart Array 6i 128-MB Battery-Backed Write Cache Enabler battery	307132-001	Yes
24	Smart Array 6i Memory Module	351518-001	Yes
25	RJ-45 Patch Panel 1, with Fibre Channel support *	322299-001	Yes
26	Transceiver, 2 GB, Fibre Channel *	229204-001	Yes

* Not shown

** DIMMs must be installed in identical pairs

Server blade secondary side components



Item	Description	Spare part number	Customer replaceable?
	Mechanical components		
1	Access panel	385846-001	Yes
2	Chassis	391900-001	Yes
	Boards		
3	System board	391899-001	Yes
	System components		
4	Processor heatsink	381812-001	Yes
5	Processor	—	—
	a) 2.6-GHz, single-core AMD Opteron™ Model 852 *	390246-001	Yes
	b) 2.8-GHz, single-core AMD Opteron™ Model 854 *	404043-001	Yes
	c) 1.8-GHz, dual-core AMD Opteron™ Model 865 *	390247-001	Yes
	d) 2.0-GHz, dual-core AMD Opteron™ Model 870 *	390248-001	Yes
	e) 2.2-GHz, dual-core AMD Opteron™ Model 875 *	391249-001	Yes
	f) 2.4-GHz, dual-core AMD Opteron™ Model 880 *	404045-001	Yes
6	Power converter modules (2)	371754-001	Yes
7	DC filter module *	371705-001	Yes
8	1p enabler board (processor blank not included) *	403929-001	Yes
	Memory		
9	DIMM, 512 MB, PC3200 DDR SDRAM **	381817-001	Yes
10	DIMM, 1 GB, PC3200 DDR SDRAM **	381818-001	Yes

Item	Description	Spare part number	Customer replaceable?
11	DIMM, 2 GB, PC3200 DDR SDRAM **	381819-001	Yes
12	DIMM, 4 GB, PC2700 DDR SDRAM **	395547-001	Yes

* Not shown.

** DIMMs must be installed in identical pairs

Removal and replacement procedures

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Safety considerations

Before performing service procedures, review all the safety information.

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Server blade warnings and cautions

- ⚠ WARNING:** To reduce the risk of injury from high-current electrical energy, do not remove the server blade access panel when power is applied through the HP ProLiant p-Class diagnostic station. Remove all power from the server blade before removing the access panel.
- ⚠ WARNING:** To reduce the risk of shock or injury from high-current electrical energy, do not remove the server blade access panel while the server blade is installed in the server blade enclosure. Do not remove the server blade access panel and then install the server blade into the server blade enclosure.
- ⚠ WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.
- ⚠ CAUTION:** When performing non-hot-plug operations, you must power down the server blade and/or the system. However, it may be necessary to leave the server blade powered up when performing other operations, such as hot-plug installations or troubleshooting.

Rack warnings and cautions

- ⚠ WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:
 - The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single-rack installation.
 - The racks are coupled together in multiple-rack installations.
 - Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
- ⚠ WARNING:** To reduce the risk of personal injury or equipment damage when unloading a rack:
 - At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and may become unstable when being moved on its casters.
 - Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.
- ⚠ WARNING:** When installing a server in a telco rack, be sure that the rack frame is adequately secured to the top and bottom of the building structure.
- ⚠ WARNING:** This server blade enclosure is very heavy. To reduce the risk of personal injury or damage to the equipment:
 - Observe local occupational health and safety requirements and guidelines for manual material handling.
 - Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. When the server blade enclosure weighs more than 22.5 kg (50 lb), at least two people must lift the server blade enclosure into the rack together. A third person may be required to help align the server blade enclosure if the server blade is installed higher than chest level.
 - Use caution when installing the server blade enclosure in or removing the server blade enclosure from the rack; it is unstable when not fastened to the rails.

- ⚠ WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.
- ⚠ CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.
- ⚠ CAUTION:** Do not operate the server blade for long periods with the access panel open or removed. Operating the server blade in this manner results in improper airflow and improper cooling that can lead to thermal damage.

Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.



This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



16.33 kg
36 lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.



These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Server blade preparation

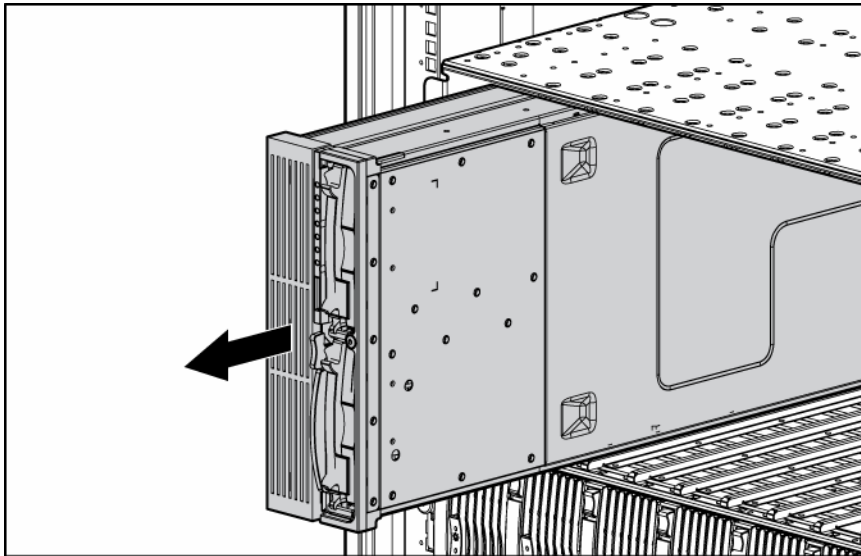
To service any internal server blade component, power down the server blade and remove it from the server blade enclosure.

⚠ CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure.

System power in server blades does not completely shut off with the front panel power switch or iLO Virtual Power Button feature. The function toggles between on and standby modes, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active.

To service internal server blade components:

1. Identify the proper server blade in the server blade enclosure.
2. Back up all server blade data.
3. Power down the server blade in one of the following ways:
 - Use the Virtual Power Button feature in the iLO Remote Console to power down the server blade from a remote location. Be sure that the server blade is in standby mode by observing that the power LED is amber.
 - Press the power button on the front of the server blade. Be sure that the server blade is in standby mode by observing that the power LED is amber.
4. Remove the server blade from the server blade enclosure.



5. Place the server blade on a flat level surface.

⚠ CAUTION: Always populate server blade enclosure bays with either a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank results in improper airflow and improper cooling that can lead to thermal damage.

To install and power up a server blade, reverse the removal procedure. Server blades are set to power up automatically upon insertion. If you have changed this setting, use the power button or iLO Virtual Power Button feature to power up the server blade.

For more information about iLO, refer to the *HP Integrated Lights-Out User Guide*.

Primary access panel

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Loosen the thumbscrew.
3. Press down on the thumb indentations, slide the access panel toward the rear of the unit about 1.25 cm (0.5 in), and lift to remove the panel.

To replace the component, reverse the removal procedure.

Secondary access panel

To remove the component:

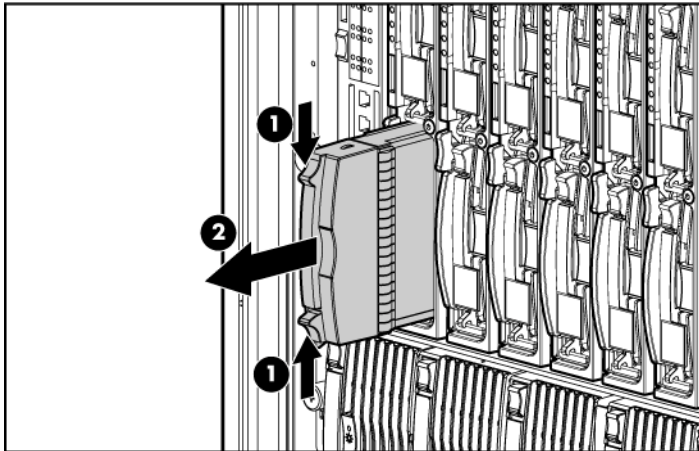
1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Loosen the thumbscrews.
3. Press down on the thumb indentations, slide the access panel toward the rear of the unit about 1.25 cm (0.5 in), and lift to remove the panel.

To replace the component, reverse the removal procedure.

Hard drive blank

To remove the component:

CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.



NOTE: Port-colored items indicate hot-plug components.

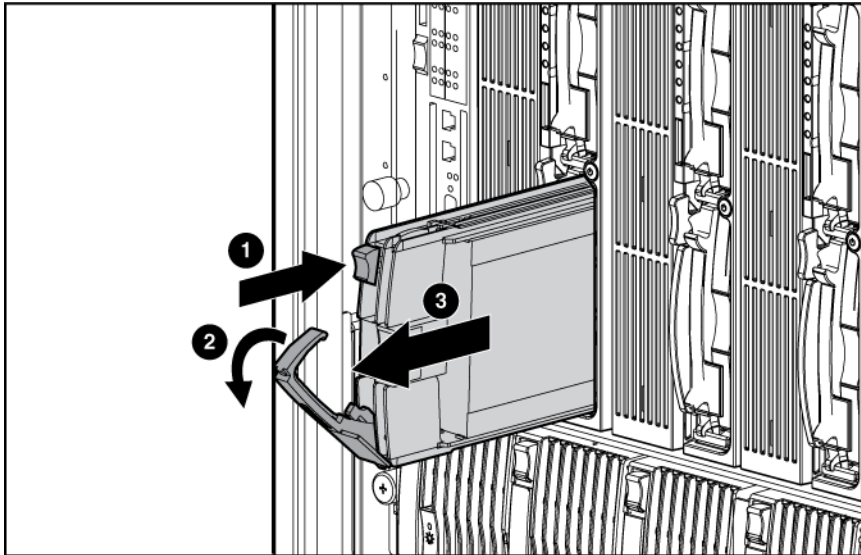
To replace the blank, slide the blank into the bay until it locks into place.

Hard drives

To remove the component:

⚠ CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Determine the status of the hard drive from the hot-plug hard drive LEDs ("[Hot-plug SCSI hard drive LEDs](#)" on page 43).
2. Back up all data on the hard drive.
3. Remove the hard drive.



📝 NOTE: Port-colored items indicate hot-plug components.

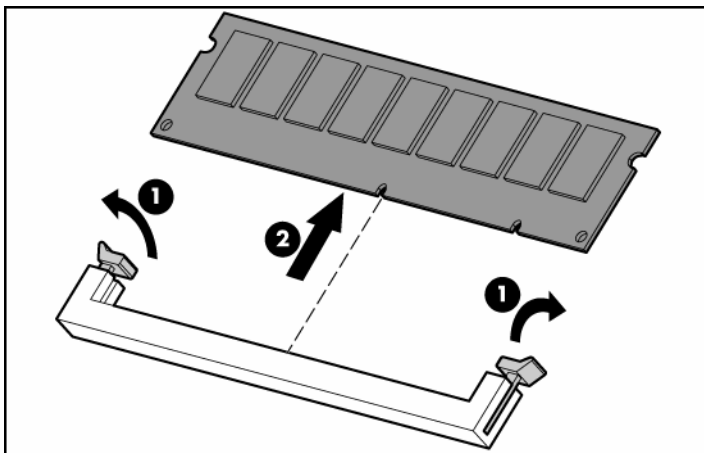
To replace the component, reverse the removal procedure.

DIMMs

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14, "[Secondary access panel](#)" on page 14).

3. Remove the DIMM.



CAUTION: Use only HP DIMMs. DIMMs from other sources may adversely affect data integrity.

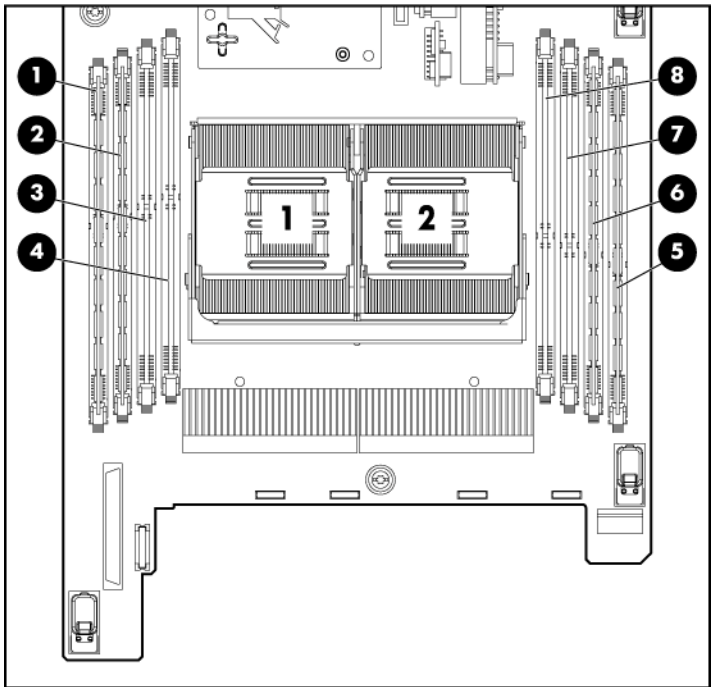
IMPORTANT: For DIMM slots 1 and 2, remove the air baffle, if necessary.

To replace the component, reverse the removal procedure.

Observe the following DIMM installation guidelines:

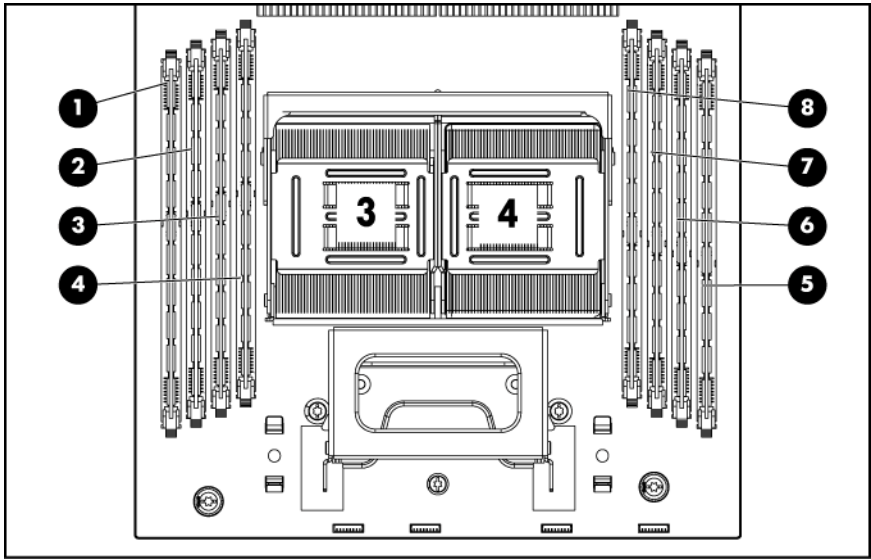
- All DIMMs must be PC3200 DDR 400-MHz SDRAM DIMMs.
- Both DIMM slots in a memory bank must be populated.
- Both DIMMs in a memory bank must be identical.
- Processor 1 memory bank 1 must always be populated.
- If mixing dual- and single-rank DIMMs, the dual-rank DIMMs must be installed in memory bank 1.
- For optimal performance in most applications, populate memory bank 1 for every populated processor socket.
- DIMM banks are active only when the corresponding processor socket is populated.

Primary system board (processors 1 and 2)



Item	Description	Memory bank
1-2	DIMM slots 1 and 2	Processor 1 memory bank 1
3-4	DIMM slots 3 and 4	Processor 1 memory bank 2
5-6	DIMM slots 5 and 6	Processor 2 memory bank 1
7-8	DIMM slots 7 and 8	Processor 2 memory bank 2

Secondary system board (processors 3 and 4)



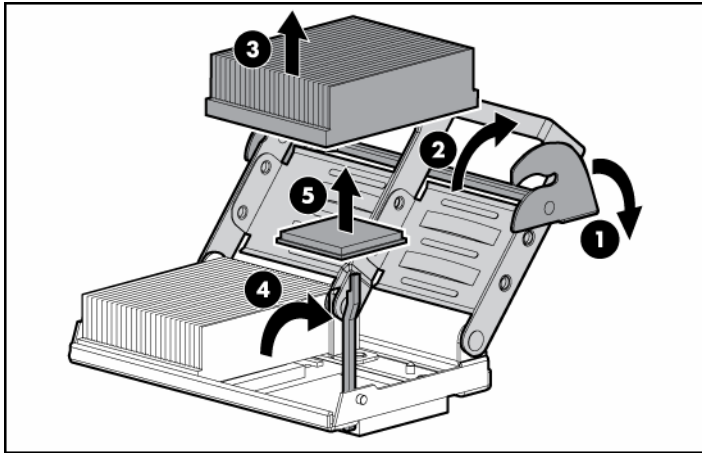
Item	Description	Memory bank
1-2	DIMM slots 9 and 10	Processor 3 memory bank 1
3-4	DIMM slots 11 and 12	Processor 3 memory bank 2

Item	Description	Memory bank
5-6	DIMM slots 13 and 14	Processor 4 memory bank 1
7-8	DIMM slots 15 and 16	Processor 4 memory bank 2

Processor

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14, "[Secondary access panel](#)" on page 14).
3. Remove the processor.



CAUTION: The heatsink is not reusable and must be discarded if removed from the processor after application.

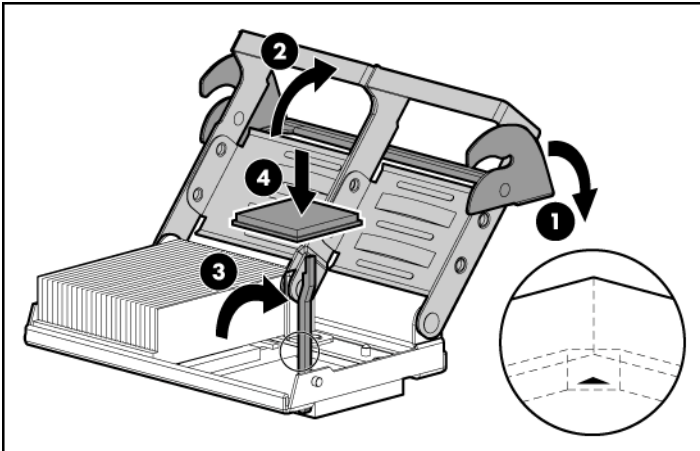
CAUTION: Always install a processor or 1P enabler board in processor socket 2. If processor socket 2 is empty, the server blade will not boot.

To replace the component:

1. Install the processor.

CAUTION: Be sure that the processor socket locking lever is open before installing the processor into the socket.

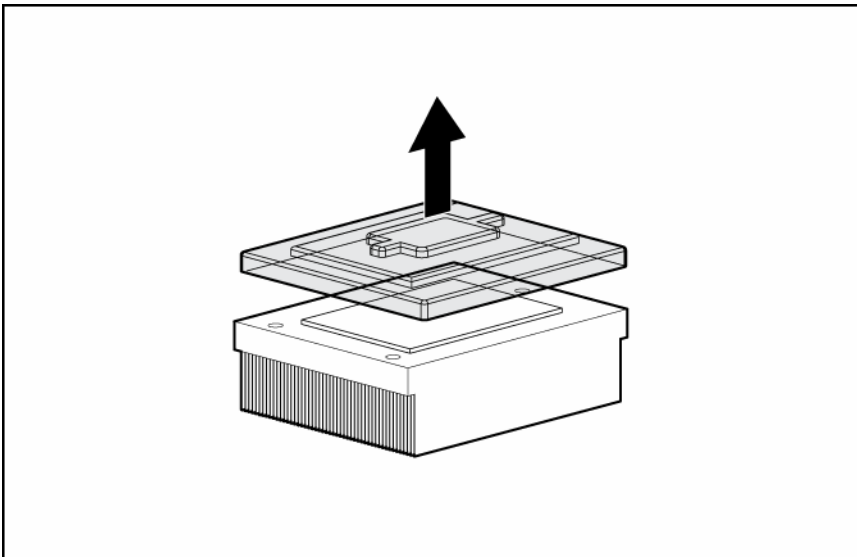
CAUTION: The processor is designed to fit one way into the socket. Use the alignment guides on the processor and socket to properly align the processor with the socket. Refer to the server blade hood label for specific instructions.



2. Close the processor socket locking lever.

CAUTION: Be sure that the processor socket locking lever is closed after the processor is installed. The lever should close without resistance. Forcing the lever closed can damage the processor and socket, requiring system board replacement.

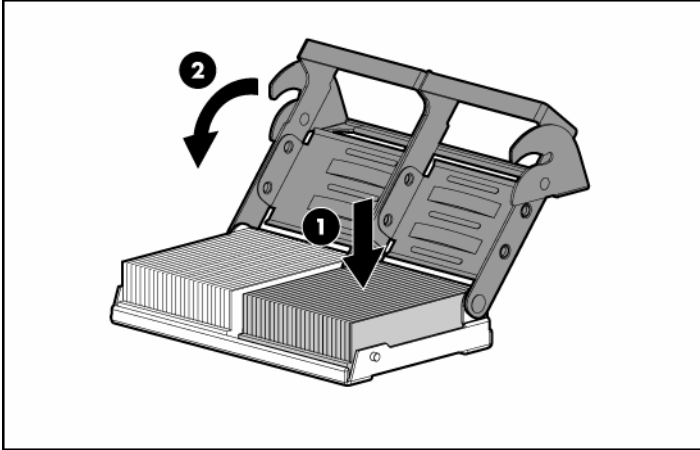
3. Remove the protective cover from the thermal interface.



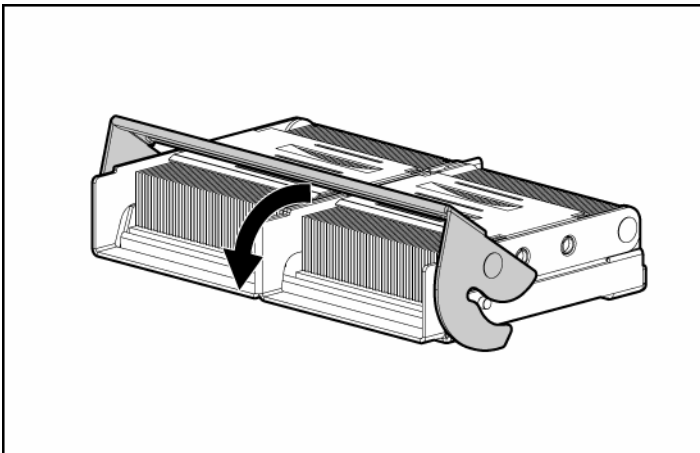
CAUTION: After the cover is removed, do not touch the thermal interface media.

IMPORTANT: The heatsink is not reusable and must be discarded if removed from the processor after application.

4. Insert the heatsink and close the processor cage. Closing the processor cage aligns the heatsink.



5. Close and secure the processor cage latch.

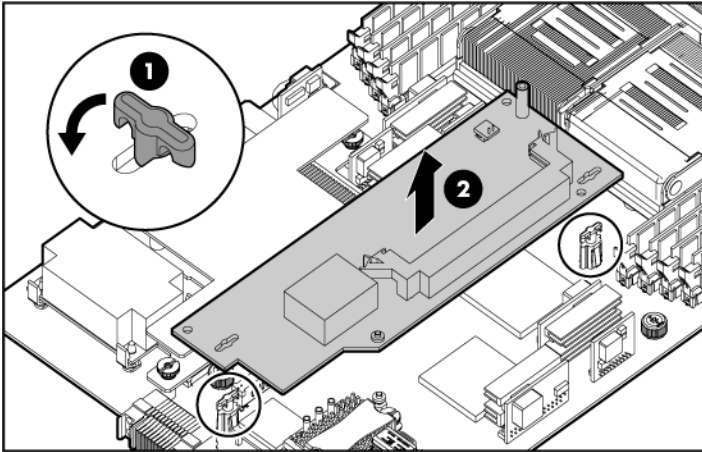


Smart Array 6i Controller

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page [13](#)).
2. Remove the access panel ("[Primary access panel](#)" on page [14](#)).
3. Remove the Smart Array 6i Controller.

⚠ CAUTION: Disconnecting the battery module cable will cause any unsaved data in the memory module to be lost.



To replace the component, reverse the removal procedure.

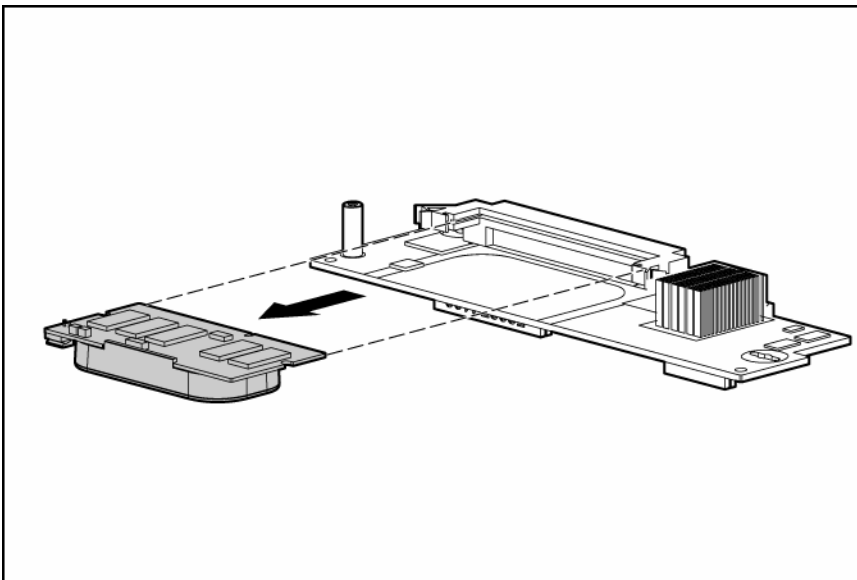
Smart Array 6i Battery-Backed Write Cache Enabler (optional)

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14).

⚠ CAUTION: Disconnecting the battery module cable will cause any unsaved data in the memory module to be lost.

3. Remove the BBWC Enabler from the Smart Array 6i Controller.



To replace the component, reverse the removal procedure.

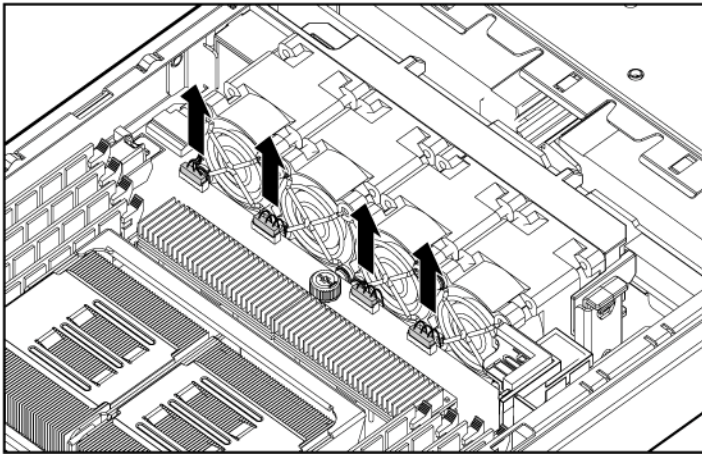
Fan assembly

To remove the component:

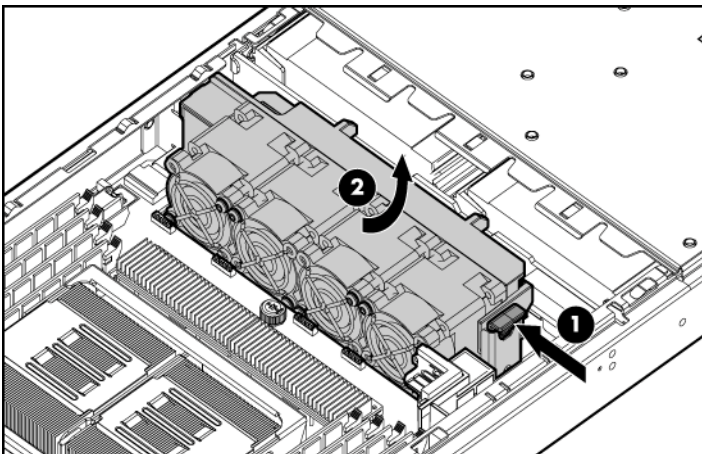
1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14, "[Secondary access panel](#)" on page 14).
3. Disconnect the fan assembly cables from the system board.



IMPORTANT: Be sure to connect the cables to the same connectors when replacing the fan assembly.



4. Press the fan retention tab and lift the assembly away from the system board.



To replace the component, reverse the removal procedure.

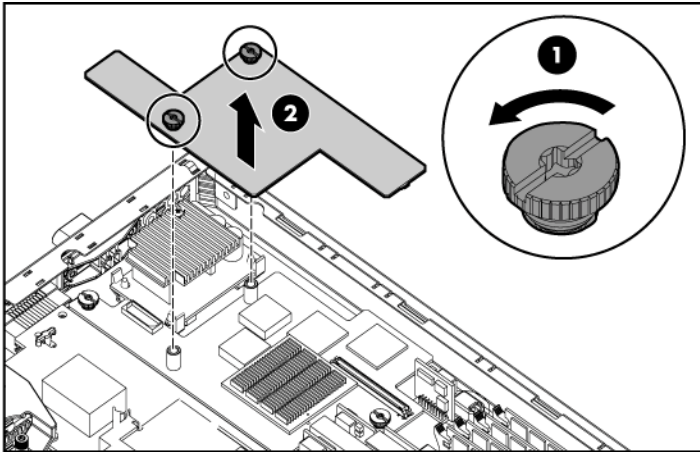
Fibre Channel mezzanine (optional)

An optional FC mezzanine enables FC support (for clustering capabilities) and SAN connection when used in conjunction with the RJ-45 Patch Panel 2 or the GbE2 Interconnect Switch with FC pass-through option. The card is installed on top of the standard NIC mezzanine card.

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14).

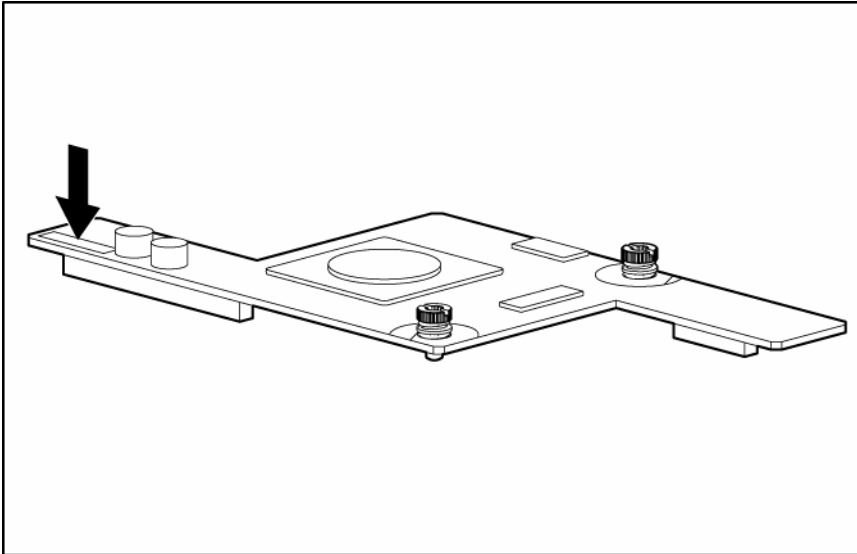
3. Loosen the thumbscrews.
4. Lift the FC mezzanine away from the system board.



To replace the component, reverse the removal procedure.



IMPORTANT: Refer to the label on the FC mezzanine to verify compatibility with the server blade.

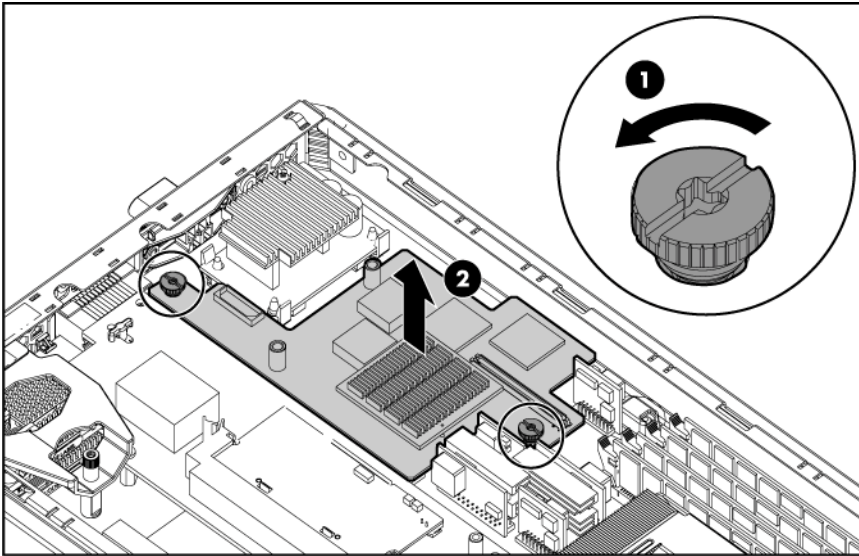


Standard NIC mezzanine card

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14).
3. Remove the FC mezzanine ("[Fibre Channel mezzanine \(optional\)](#)" on page 22).
4. Loosen the thumbscrews.
5. Lift the standard NIC mezzanine card away from the system board.

CAUTION: Be sure to lift the board straight up. Lifting one edge of the board at a time may damage the connectors.



To replace the component, reverse the removal procedure.

SCSI backplane

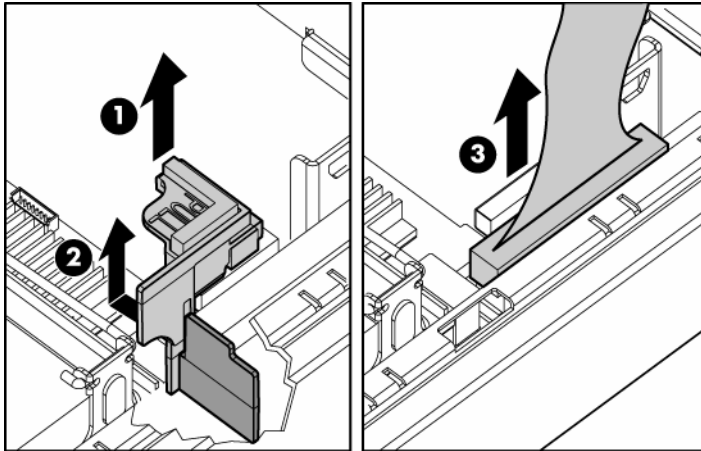
To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14).
3. Remove all hard drive blanks ("[Hard drive blank](#)" on page 14).
4. Remove all hot-plug SCSI hard drives ("[Hard drives](#)" on page 15).
5. Remove the fan assembly ("[Fan assembly](#)" on page 22).
6. Disconnect the SCSI backplane power cable from the system board.
7. Remove the plastic air baffle.
8. Disconnect the SCSI backplane signal cable from the system board.

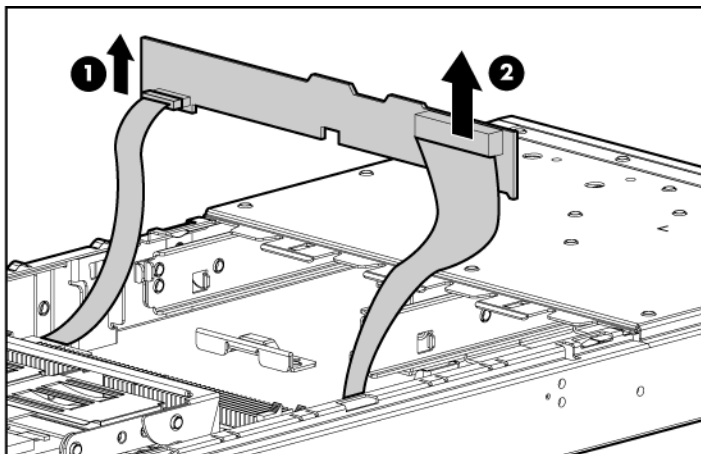
CAUTION: Be sure the LED board cable is not disengaged when removing the air baffle. When reinstalling the air baffle, be sure the cable is fully seated.



NOTE: The air baffle is most easily removed at a 45° angle.



9. Grasp the SCSI backplane on the left side when facing the rear of the server blade and lift slightly to rotate the SCSI backplane out.
10. Lift the SCSI backplane out of the chassis.



To replace the component, reverse the removal procedure.

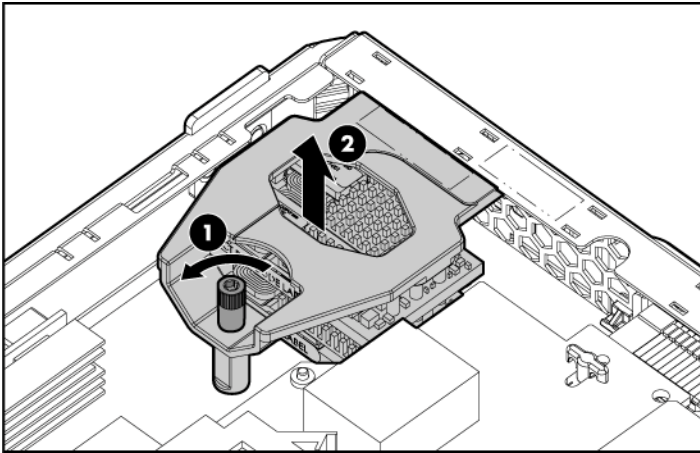
Power converter module

To remove the component from the primary chassis:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14).
3. Loosen the thumbscrew and remove the power converter module.
4. Remove the power converter module retainers from the power converter module and store for use on the new power converter module.



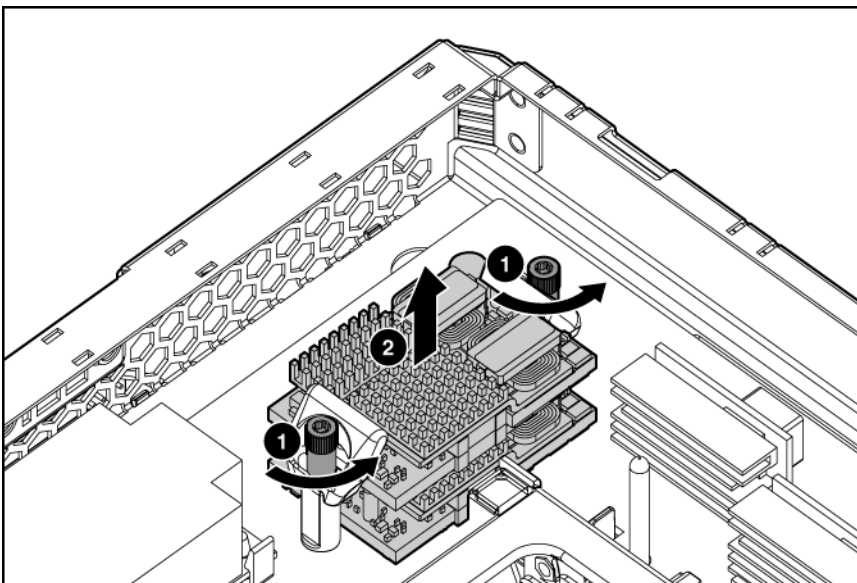
NOTE: The server requires two power converter modules installed one on top of the other. The power converter modules may separate during removal or installation. Be sure to align the modules and press together before installing on the system board.



To replace the component, reverse the removal procedure.

To remove the component from the secondary chassis:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Secondary access panel](#)" on page 14).
3. Loosen the thumbscrews and remove the power converter module.
4. Remove the power converter module retainers from the power converter module and store for use on the new power converter module.



To replace the component, reverse the removal procedure.

DC filter module

To remove the component:

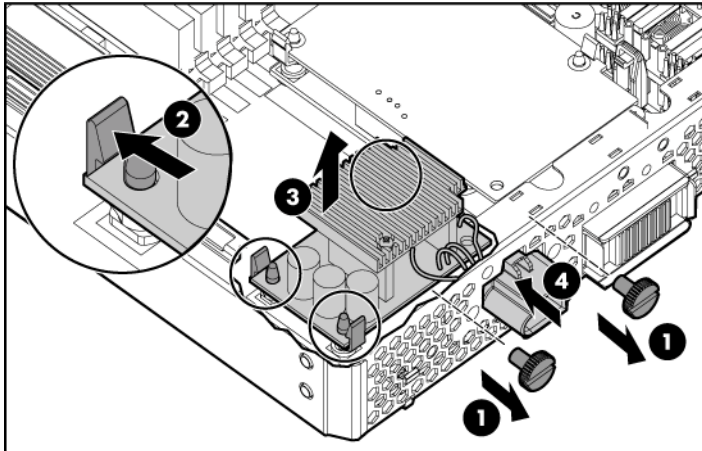
1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).

2. Remove the access panel ("[Primary access panel](#)" on page 14, "[Secondary access panel](#)" on page 14).
3. Remove the thumbscrews on the back of the chassis to release the power connector.



NOTE: The power connector will not push completely into the chassis until the DC filter module is removed. It may be necessary to push in the power connector while removing the DC filter module.

4. Release the latches and lift the DC filter module away from the system board while pushing the power connector into the chassis.



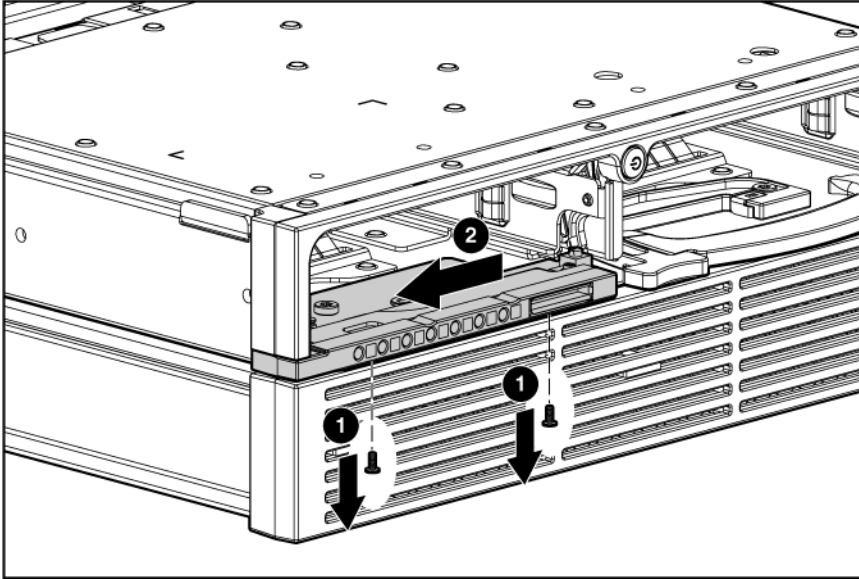
To replace the component, reverse the removal procedure.

Power button/LED board

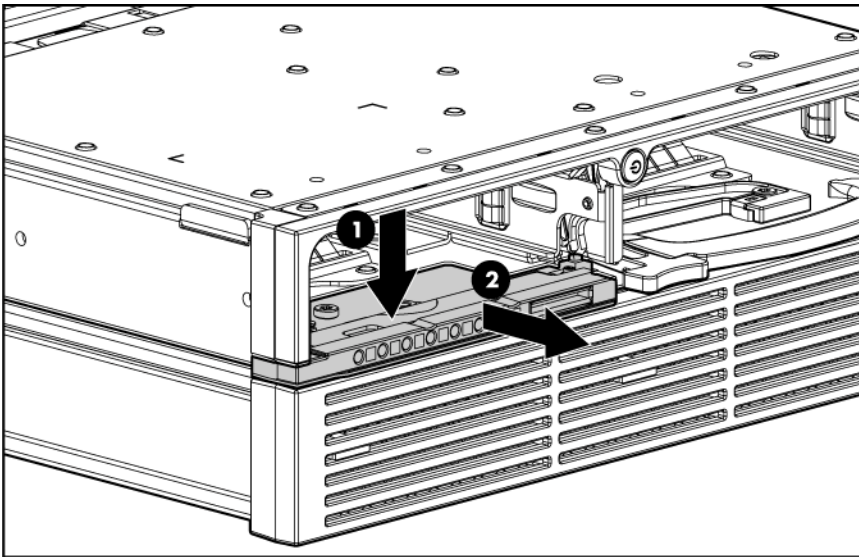
To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the primary and secondary access panels ("[Primary access panel](#)" on page 14, "[Secondary access panel](#)" on page 14).
3. Remove all hard drive blanks ("[Hard drive blank](#)" on page 14).
4. Remove all hot-plug SCSI hard drives ("[Hard drives](#)" on page 15).
5. Using a T-8 Torx screwdriver, remove the two retaining screws from the bottom of the chassis.
6. Disconnect the power button/LED cable from the rear left side of the power button/LED board.

7. Slide the power button/LED board toward the left outside edge of the chassis.



8. Tilt the front edge of the power button/LED board down until the keyholes on the rear of the board clear the alignment pins.
9. Slide the power button/LED board out of the front of the chassis.



IMPORTANT: Be sure the tab at the end of the power button/LED cable is inserted under the power button/LED board bezel.

To replace the component, reverse the removal procedure.

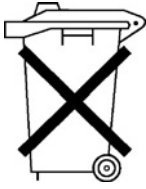
System board battery

If the server blade no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.



WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

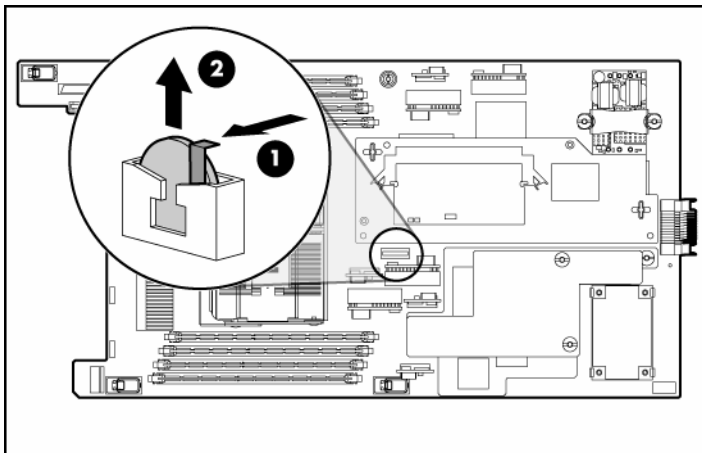
For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

CAUTION: Loss of BIOS settings occurs if the lithium battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.

IMPORTANT: After replacing the battery, the server blade is automatically configured with the default settings. The user can update these settings using RBSU.

To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Primary access panel](#)" on page 14).
3. Locate the battery holder on the system board.
4. Remove the existing battery by pushing the tab aside and pulling the battery straight up.



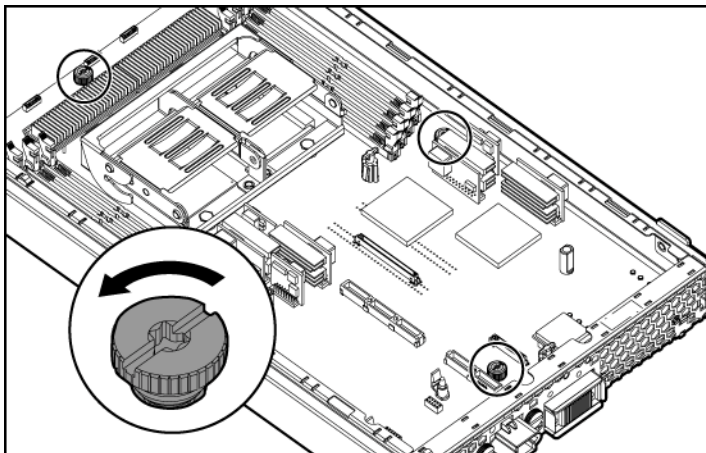
To install the system board battery, push it into the socket until the tab locks in place.

Primary system board

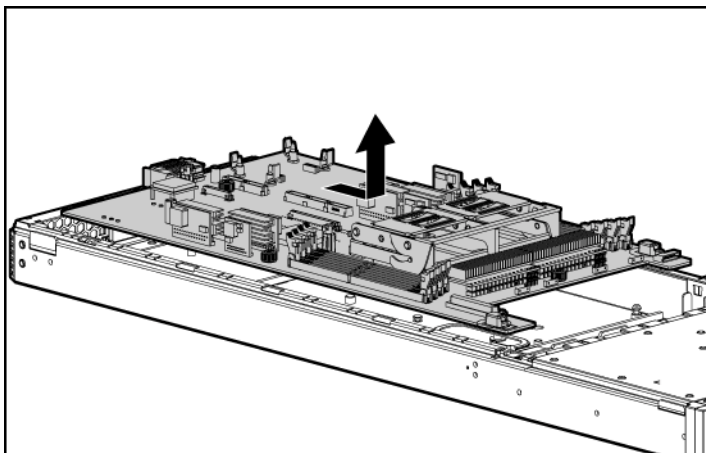
To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the secondary system board ("[Secondary system board](#)" on page 31).
3. Remove the access panel ("[Primary access panel](#)" on page 14).
4. Remove all DIMMs ("[DIMMs](#)" on page 15).
5. Remove the processors ("[Processor](#)" on page 18).

6. Remove the fan assembly ("[Fan assembly](#)" on page 22).
7. Remove the Smart Array 6i Controller ("[Smart Array 6i Controller](#)" on page 20).
8. Remove the FC mezzanine ("[Fibre Channel mezzanine \(optional\)](#)" on page 22).
9. Remove the NIC mezzanine card ("[Standard NIC mezzanine card](#)" on page 23).
10. Remove the SCSI backplane ("[SCSI backplane](#)" on page 24).
11. Remove the power converter module ("[Power converter module](#)" on page 25).
12. Remove the DC filter module ("[DC filter module](#)" on page 26).
13. Loosen the system board thumbscrews.

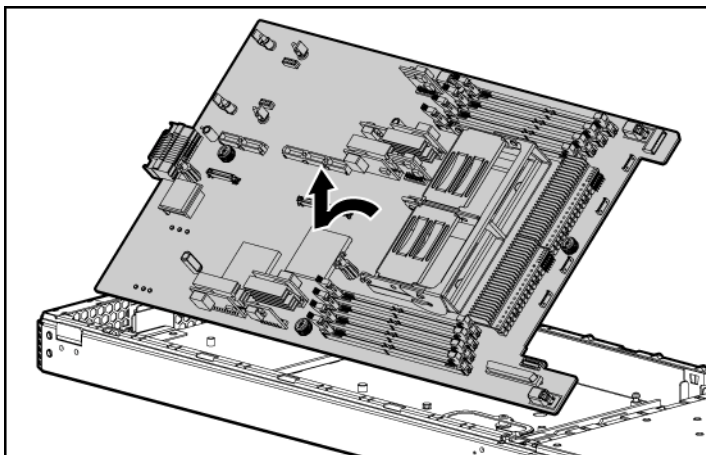


14. Disconnect the LED cable from the system board before removing the system board from the server blade.
15. Slide the system board toward the front of the server blade.
16. Lift the system board until it comes off the alignment keys.



17. Lift the edge of the system board nearest the system switches. The edge of the system board nearest the Smart Array 6i Controller connectors tilts down into the chassis, and the edge of the system board nearest the system switches tilts up out of the chassis.

18. Lift the system board out of the chassis.

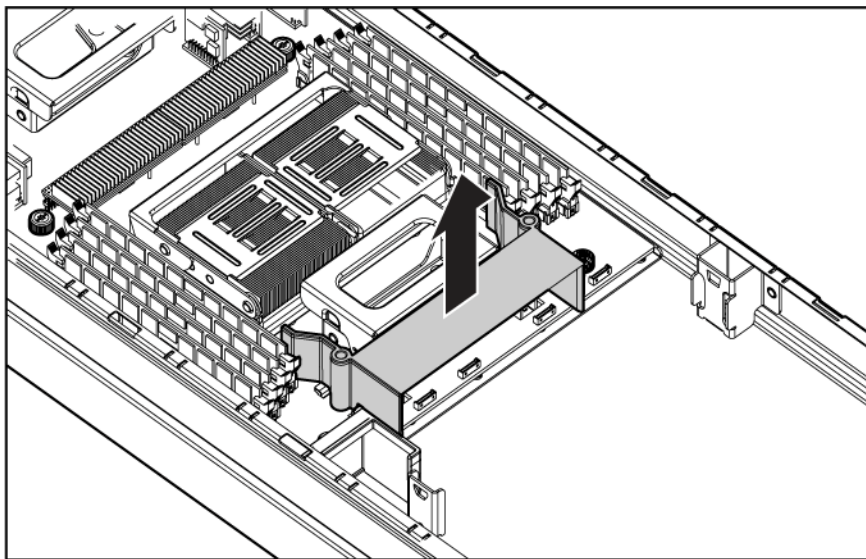


To replace the component, reverse the removal procedure.

Secondary system board

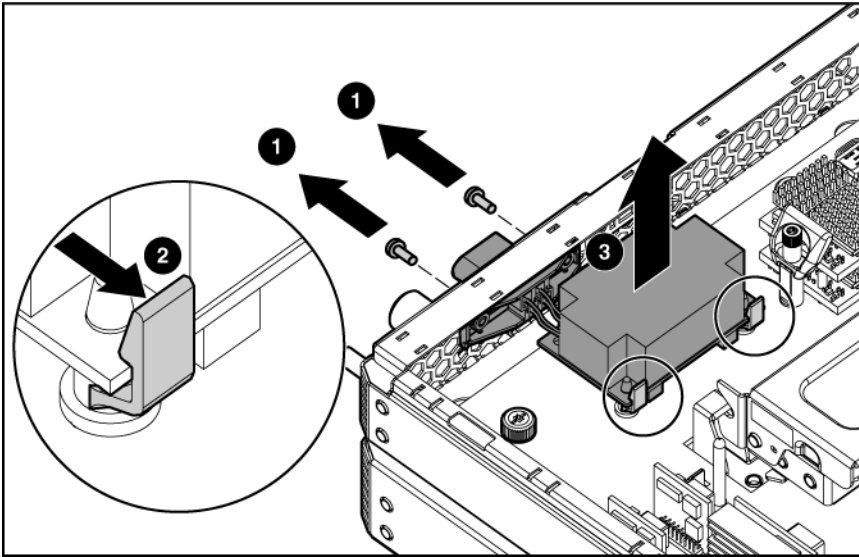
To remove the component:

1. Power down the server blade and remove it from the server blade enclosure ("[Server blade preparation](#)" on page 13).
2. Remove the access panel ("[Secondary access panel](#)" on page 14).
3. Remove all DIMMs ("[DIMMs](#)" on page 15).
4. Remove the processors ("[Processor](#)" on page 18).
5. Remove the air baffle.

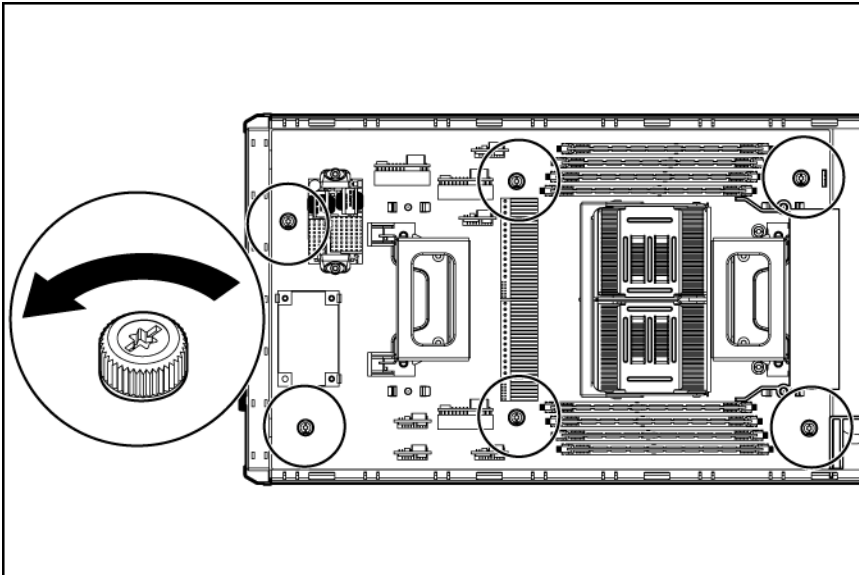


6. Remove the fan assembly ("[Fan assembly](#)" on page 22).
7. Remove the power converter module ("[Power converter module](#)" on page 25).

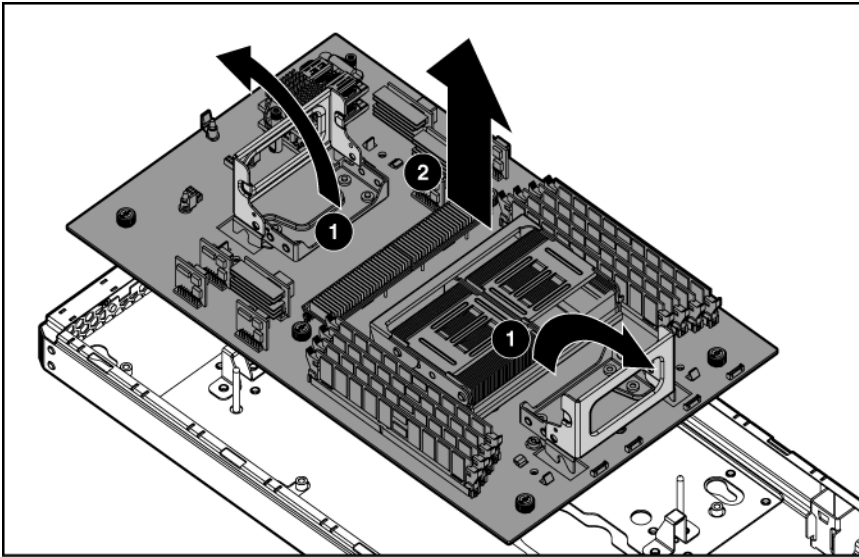
8. Remove the DC filter module.



9. Loosen the system board thumbscrews.



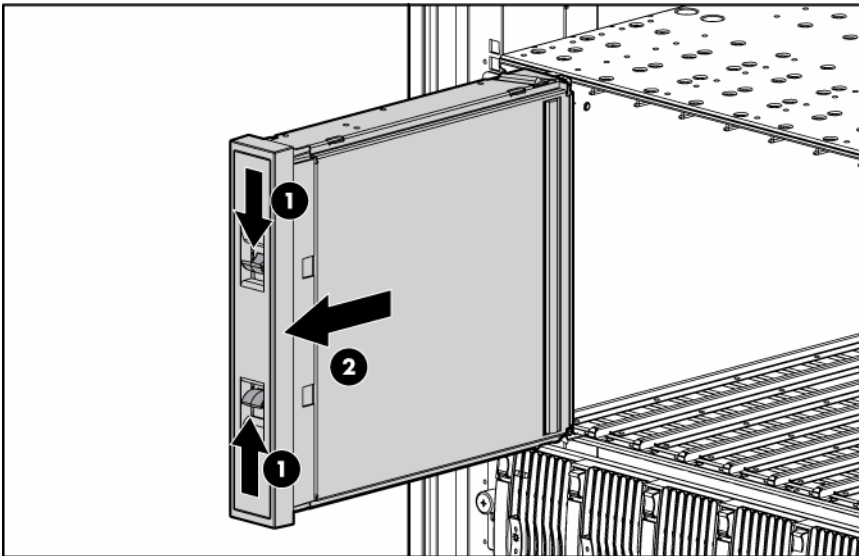
10. Open the system board handles and lift the system board out of the chassis.



To replace the component, reverse the removal procedure.

Server blade bay blank

Remove the server blade blank from the server blade enclosure.



CAUTION: To prevent improper cooling and thermal damage, do not operate the server blade enclosure unless all bays are populated with either a component or a blank.

To replace a server blade blank, align the blank with the empty bay and slide it in until the blank is fully seated.

Diagnostic tools

In this section

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Survey Utility.....	34
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HP Insight Diagnostics

HP Insight Diagnostics is a proactive server blade management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server blade installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, launch the SmartStart CD.

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server blade management. Available in Microsoft® Windows® and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, refer to the HP website (<http://www.hp.com/servers/diags>).

Survey Utility

Survey Utility, a feature within HP Insight Diagnostics (on page 34), gathers critical hardware and software information on ProLiant server blades.

This utility supports operating systems that may not be supported by the server blade. For operating systems supported by the server blade, refer to the HP website (<http://www.hp.com/go/supportos>).

If a significant change occurs between data-gathering intervals, the Survey Utility marks the previous information and overwrites the Survey text files to reflect the latest changes in the configuration.

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP.

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM
- From within Survey Utility (on page 34)
- From within operating system-specific IML viewers
 - For NetWare: IML Viewer
 - For Windows®: IML Viewer

- For Linux: IML Viewer Application
- From within the iLO user interface
- From within HP Insight Diagnostics (on page [34](#))

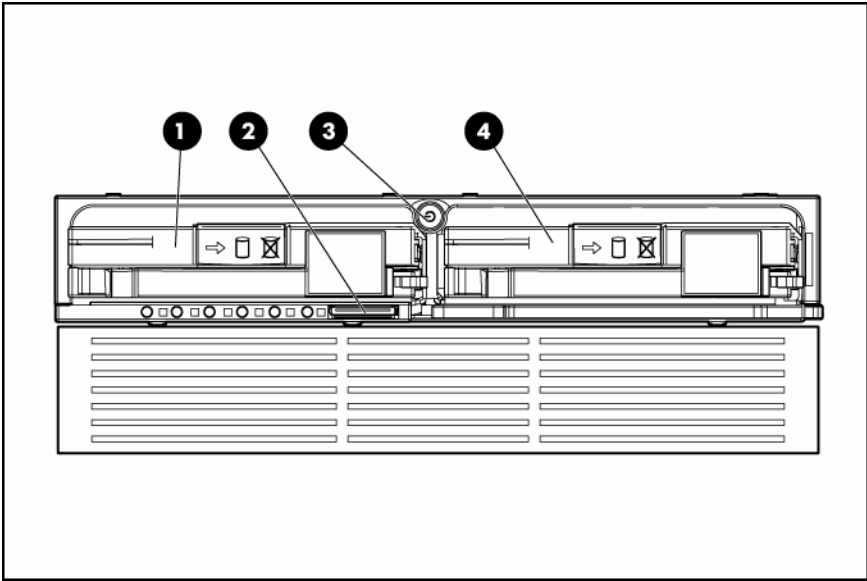
For more information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack.

Server component identification

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Internal components.....	39
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System maintenance switch procedures.....	41
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Hot-plug SCSI hard drive LED combinations.....	43

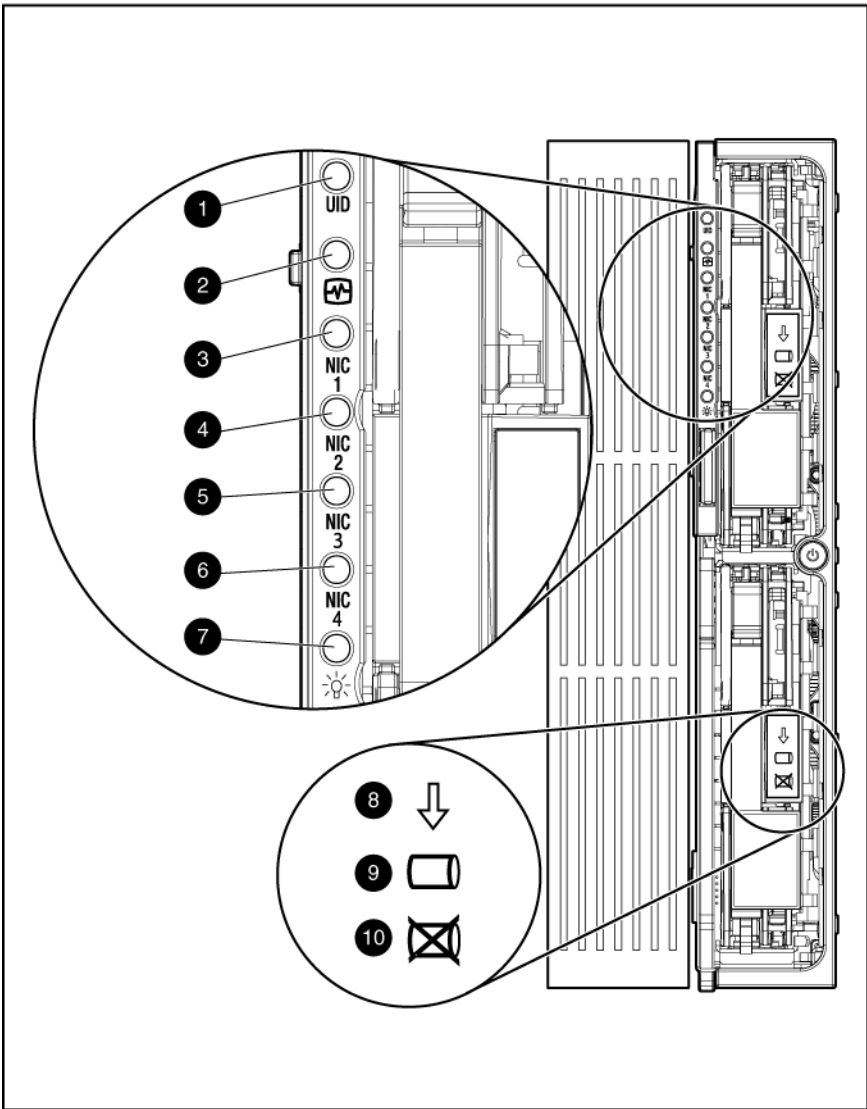
Front panel components



Item	Description
1	Hot-plug SCSI hard drive bay 1
2	I/O port*
3	Power On/Standby button
4	Hot-plug SCSI hard drive bay 2

* The I/O port is used with the local I/O cable to perform some server blade configuration and diagnostic procedures.

Front panel LEDs

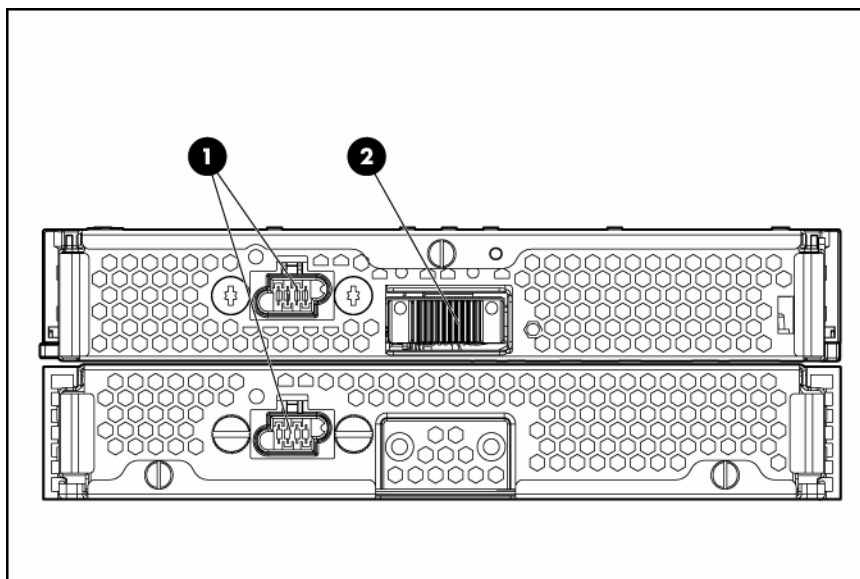


Item	Description	Status
1	UID LED	Blue = Identified Blue flashing = Active remote management Off = No active remote management
2	Health LED	Green = Normal Green flashing = Booting Amber = Degraded condition Red = Critical condition
3	NIC 1 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity

Item	Description	Status
4	NIC 2 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity
5	NIC 3 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity
6	NIC 4 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity
7	Power On/Standby LED	Green = On Amber = Standby (auxiliary power available) Off = Off
8	Hard drive activity LED	Green/Flashing = Activity Off = No activity
9	Online status	Flashing = Online activity Off = No online activity
10	Fault status	Flashing = Fault process activity Off = No fault process activity

* Actual NIC numeration depends on several factors, including the operating system installed on the server blade.

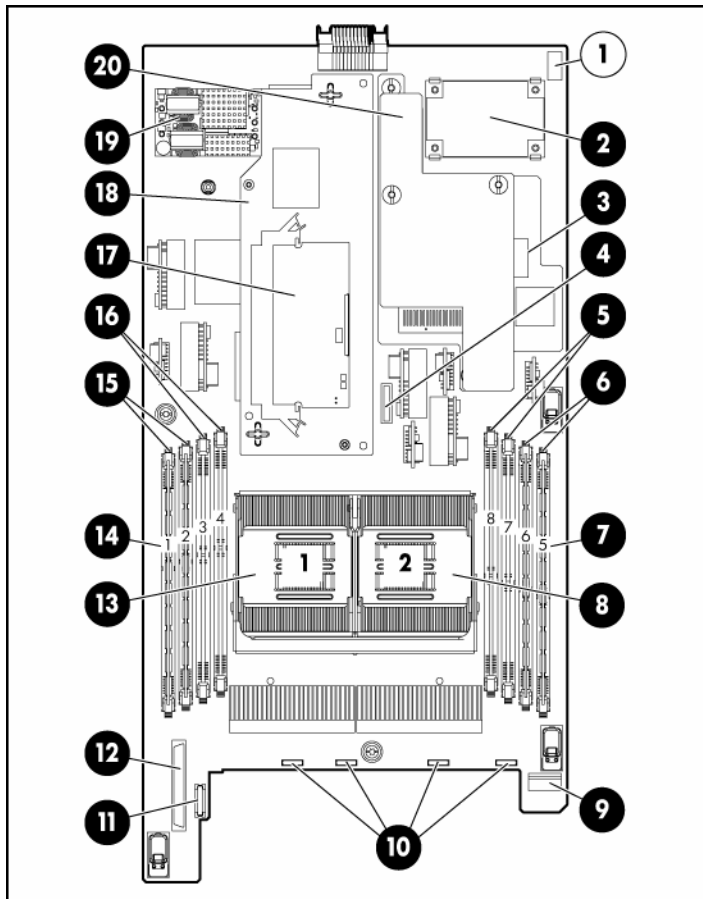
Rear panel components



Item	Description
1	Power connectors
2	Signal connector

Internal components

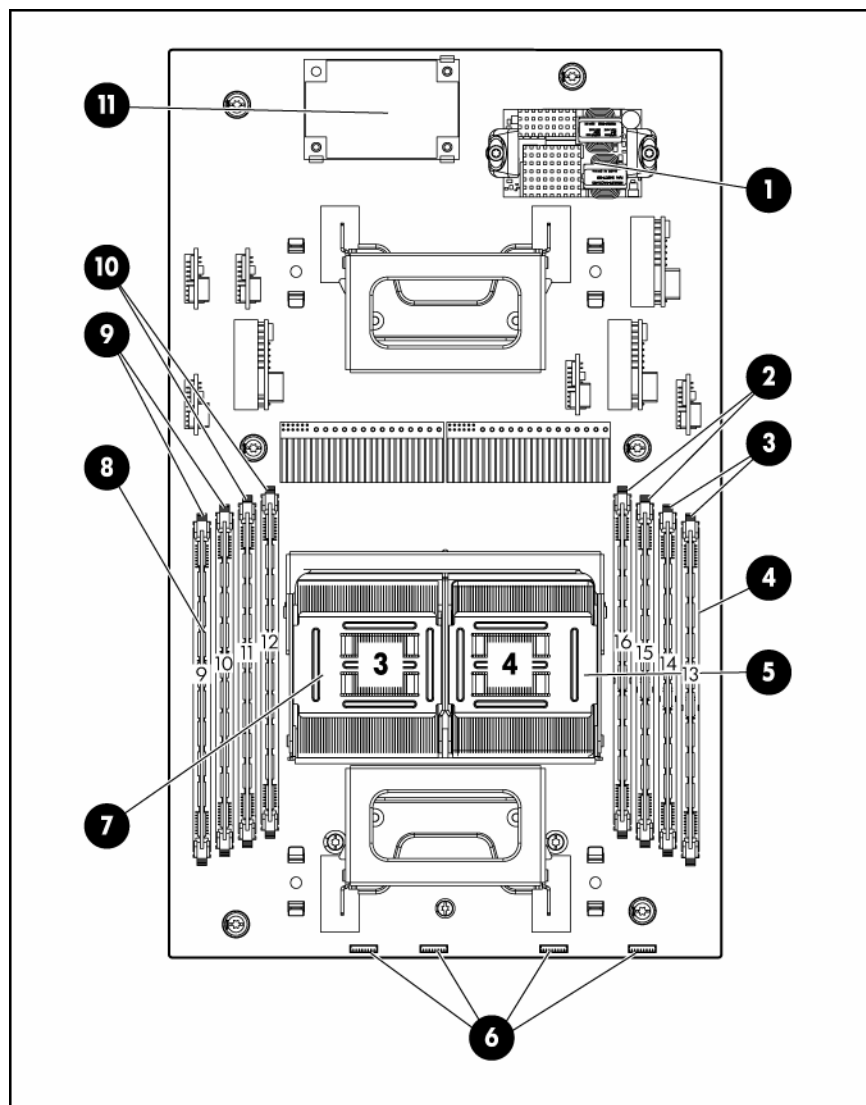
Primary system board (processors 1 and 2)



Item	Description
1	System maintenance switch (SW1)
2	DC filter module
3	Standard NIC mezzanine card
4	System battery
5	Processor 2 memory bank 2
6	Processor 2 memory bank 1 (shown populated)
7	DIMMs 5-8
8	Processor socket 2 (shown populated)
9	SCSI backplane board connector 2
10	Fan connectors
11	Power button/LED board connector
12	SCSI backplane board connector 1
13	Processor socket 1 (shown populated)
14	DIMMs 1-4
15	Processor 1 memory bank 1 (shown populated)
16	Processor 1 memory bank 2

Item	Description
17	HP Smart Array 6i Battery-Backed Write Cache Enabler (optional)
18	HP Smart Array 6i Controller
19	Power converter modules
20	FC mezzanine (optional)

Secondary system board (processors 3 and 4)



Item	Description
1	Power converter modules
2	Processor 4 memory bank 2
3	Processor 4 memory bank 1 (shown populated)
4	DIMMs 13-16
5	Processor socket 4 (shown populated)
6	Fan connectors

Item	Description
7	Processor socket 3 (shown populated)
8	DIMMs 9-12
9	Processor 3 memory bank 1 (shown populated)
10	Processor 3 memory bank 2
11	DC filter module

System maintenance switch

Position	Function	Default
1 *	iLO Security override	Off
2	Configuration lock	Off
3	Reserved	Off
4	Reserved	Off
5 *	Password disabled	Off
6 *	Reset configuration	Off
7	Reserved	Off
8	Reserved	Off

*To access redundant ROM, set S1, S5, and S6 to ON.

System maintenance switch procedures

When you perform troubleshooting steps, this guide may instruct you to perform the following procedures:

- Clear the system configuration ("[Clearing the system configuration](#)" on page 41).
- Access the redundant ROM ("[Accessing the redundant ROM](#)" on page 42).

To complete these procedures, you must change physical settings on the system maintenance switch (SW1).

Clearing the system configuration

To clear the system configuration:

1. Power down the server blade and disconnect the server blade from all power sources.
2. Remove the access panel ("[Primary access panel](#)" on page 14, "[Secondary access panel](#)" on page 14).
3. Change position 6 of SW1 to on.
4. Install the access panel.
5. Connect the server blade to system power and power up the server blade.
6. Wait for the POST message that prompts you to change the switch setting:
Maintenance switch detected in the "On" position.
Power off the server and turn switch to the "Off" position.
7. Repeat steps 1 through 3.
8. Change position 6 of SW1 to off.

9. Repeat steps 5 through 7.



IMPORTANT: When the server blade boots after NVRAM is cleared, a delay of up to 2 minutes is normal. During this delay, the system appears non-functional. Do not attempt any procedures during the delay.

Accessing the redundant ROM

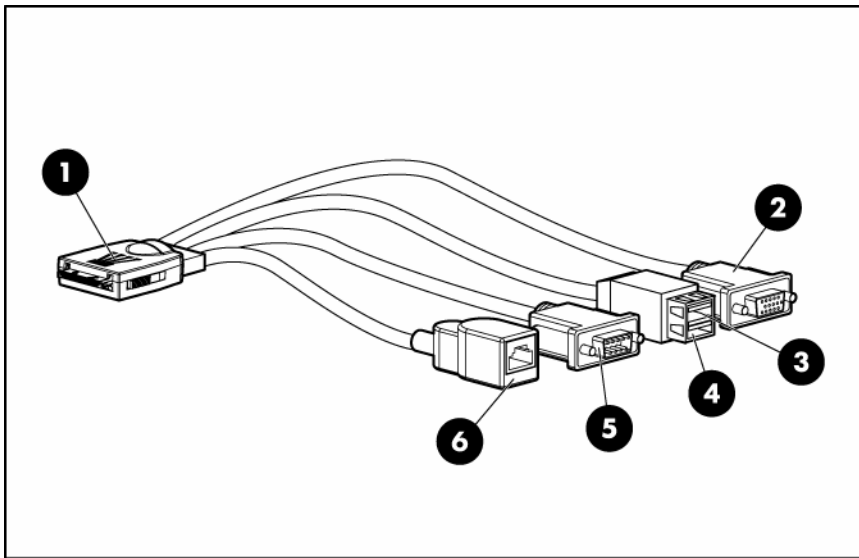
If the system ROM is corrupted, you can set the system to use the backup version or redundant ROM.

To use the redundant ROM:

1. Power down the server blade and disconnect the server blade from all power sources.
2. Remove the access panel ("Primary access panel" on page 14, "Secondary access panel" on page 14).
3. Change positions 1, 5, and 6 of SW1 to on.
4. Install the access panel ("Primary access panel" on page 14, "Secondary access panel" on page 14).
5. Connect the server blade to system power and power up the server blade.
6. Repeat steps 1 through 3.
7. Change positions 1, 5, and 6 of SW1 to off.
8. Repeat steps 5 through 7.

If both the current and backup versions of the ROM are corrupt, you must return the system board for a service replacement.

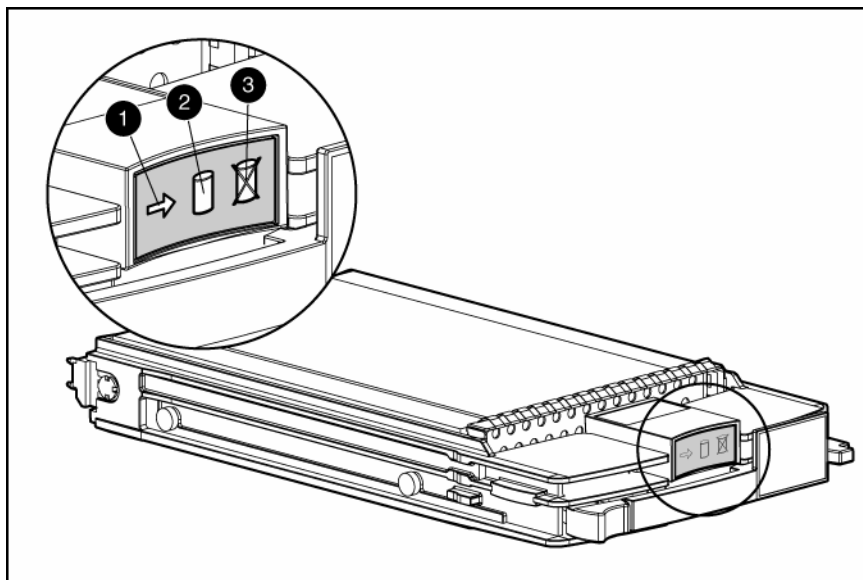
Local I/O cable



Item	Connector	Description
1	Local I/O	For connecting to the local I/O port on the server blade front panel
2	Video	For connecting a video monitor
3	USB 1	For connecting a USB device
4	USB 2	For connecting a USB device

Item	Connector	Description
5	Serial	For trained personnel to connect a null modem serial cable and perform advanced diagnostic procedures
6	iLO RJ-45 (10/100 Ethernet)	For connecting an Ethernet to the server blade iLO interface from a client device

Hot-plug SCSI hard drive LEDs



Item	LED description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is offline.
3	Fault status	On = Drive failure Flashing = Fault-process activity Off = No fault-process activity

Hot-plug SCSI hard drive LED combinations

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On, off, or flashing	On or off	Flashing	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On, off, or flashing	On	Off	The drive is online and is configured as part of an array. If the array is configured for fault tolerance and all other drives in the array are online, and a predictive failure alert is received or a drive capacity upgrade is in progress, you may replace the drive online.
On or flashing	Flashing	Off	Do not remove the drive. Removing a drive may terminate the current operation and cause data loss. The drive is rebuilding or undergoing capacity expansion.
On	Off	Off	Do not remove the drive. The drive is being accessed, but (1) it is not configured as part of an array; (2) it is a replacement drive and rebuild has not yet started; or (3) it is spinning up during the POST sequence.
Flashing	Flashing	Flashing	Do not remove the drive. Removing a drive may cause data loss in non-fault-tolerant configurations. One or more of the following conditions may exist: <ul style="list-style-type: none"> • The drive is part of an array being selected by an array configuration utility • Drive Identification has been selected in HP SIM • The drive firmware is being updated
Off	Off	On	The drive has been placed offline due to hard disk drive failure or subsystem communication failure. You may need to replace the drive.
Off	Off	Off	One or more of the following conditions may exist: <ul style="list-style-type: none"> • The drive is not configured as part of an array • The drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet • The drive is configured as an online spare If the drive is connected to an array controller, you may replace the drive online.

Specifications

In this section

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Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 60°C (-40°F to 140°F)
Storage	-20°C to 60°C (-4 to 140°C)
Maximum wet bulb temperature	30°C (86°F)
Relative humidity (noncondensing)**	
Operating	10% to 90%
Shipping	10% to 90%
Storage	10% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

Server specifications

Dimensions	Specifications
Height	8.699 cm (3.425 in)
Depth	71.1 cm (28.00 in)
Width	26.14 cm (10.29 in)
Weight (maximum)	16.33 kg (36 lb)

Acronyms and abbreviations

BBWC

battery-backed write cache

BIOS

Basic Input/Output System

DDR

double data rate

ESD

electrostatic discharge

FC

Fibre Channel

I/O

input/output

iLO

Integrated Lights-Out

IML

Integrated Management Log

IP

Internet Protocol

LED

light-emitting diode

NIC

network interface controller

POST

Power-On Self Test

PSP

ProLiant Support Pack

RBSU

ROM-Based Setup Utility

RILOE

Remote Insight Lights-Out Edition

ROM

read-only memory

SA

Smart Array

SCSI

small computer system interface

SIM

Systems Insight Manager

UID

unit identification

UPS

uninterruptible power system

USB

universal serial bus

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